

299-W18-183 (A7665) Log Data Report

Borehole Information:

Borehole: 299-W18-183 (A7665)		Site: Z-12 Crib	
Coordinates (WA St Plane)		GWL ¹ (ft): None	GWL Date: 11/28/05
North	East	Drill Date	Elevation (ft) (TOC)
135404.995	566363.637	05/80	686.04
		Total Depth (ft)	Type
		38	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	2.0	6 3/4	6	3/8	2.0	38

Borehole Notes:

Casing diameter and stickup measurements were acquired using a caliper and steel tape. Logging data acquisition is referenced to the top of casing (TOC).

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System: Gamma 1E		Type: SGLS (70%) SN: 34-TP40587A
Effective Calibration Date: 01/10/06	Calibration Reference: DOE/EM-GJ1106-2006	
Logging Procedure: MAC-HGLP 1.6.5, Rev. 0		

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 - Repeat	3	4
Date	02/07/06	02/07/06		
Logging Engineer	McClellan	McClellan		
Start Depth (ft)	37.0	32.0		
Finish Depth (ft)	2.0	26.0		
Count Time (sec)	100	400		
Live/Real	R	R		
Shield (Y/N)	N	N		
MSA Interval (ft)	1.0	0.5		
ft/min	N/A ²	N/A		
Pre-Verification	AE157CAB	AE157CAB		
Start File	AE157000	AE157036		
Finish File	AE157035	AE157048		
Post-Verification	AE157CAA	AE157CAA		
Depth Return Error (in.)	LOW 0.5	0.0		
Comments	No fine-gain adjustment.	No fine-gain adjustment. Repeat log.		

Logging Operation Notes:

Pre- and post-survey verification measurements for the SGLS employed the Amersham KUTh verifier with serial number 118. Logging was conducted with a centralizer on the sonde. The sonde un-weighted at 37.4 ft. The repeat log for this borehole was collected at 400-sec per spectrum at 0.5-ft intervals in part to evaluate the logging system's performance, and also to acquire spectra with improved resolution in order to

better assay potential transuranic isotopes that may occur in this borehole. Transuranics are common constituents in the waste streams of the 'Z' cribs.

Analysis Notes:

Analyst:	Pope	Date:	09/25/06	Reference:	GJO-HGLP 1.6.3, Rev. 0
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Pre-run and post-run verifications for the logging system were performed before and after data acquisition. Acceptance criteria were met for both spectra.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet template identified as G1EJan06.xls. A casing correction for 0.375-in. thick casing was applied to the SGLS data.

Results and Interpretations:

¹³⁷Cs was detected from 8 to 11 ft in this borehole, at concentrations of approximately 0.15 to 0.20 pCi/g. The average MDL³ for ¹³⁷Cs in this borehole is approximately 0.15 to 0.20 pCi/g. The spectra were examined, and the peaks at 662 keV were evident.

²³⁷Np was detected from 26 to 30 ft in this borehole, at concentrations ranging from 0.5 to 3.2 pCi/g. The average MDLs for ²³⁷Np are approximately 0.35 for the 400-sec log, and 0.6 for the 100-sec log. The 312 keV energy peak from ²³³Pa (a decay product of ²³⁷Np) was used to assay ²³⁷Np.

Westinghouse Hanford Company logged this borehole in 1993 and Waste Management Federal Services NW logged it again in 1998, both employing the Radionuclide Logging System (RLS). The ¹³⁷Cs concentrations determined by the RLS, and decayed to 2006, show good agreement with the current SGLS measurements. ²³⁷Np was not identified in the 1993 log. Partial reprocessing of the raw spectral files from that log, however, does indicate the presence of ²³⁷Np at approximately 28 to 29 ft, based on the presence of the 312 keV line from ²³³Pa. The maximum ²³⁷Np concentration determined from the RLS in 1998 (approx. 2.2 pCi/g) appears to be lower than the maximum from the current SGLS log (approx. 3.2 pCi/g).

The repeat section for the SGLS indicates good agreement for the naturally occurring radionuclides. Even with the increased count time (400 seconds), no additional manmade radionuclides were identified. Because transuranic waste is a known constituent of the waste streams in the Z-area cribs, an additional plot of the MDLs for ²³⁹Pu and ²⁴¹Am is presented.

List of Plots:

Manmade Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma and Dead Time
Manmade Radionuclides (100- vs. 400-second counts)
Repeat Section of Natural Gamma Logs
MDLs for Selected Transuranic Radionuclides
Manmade Comparison

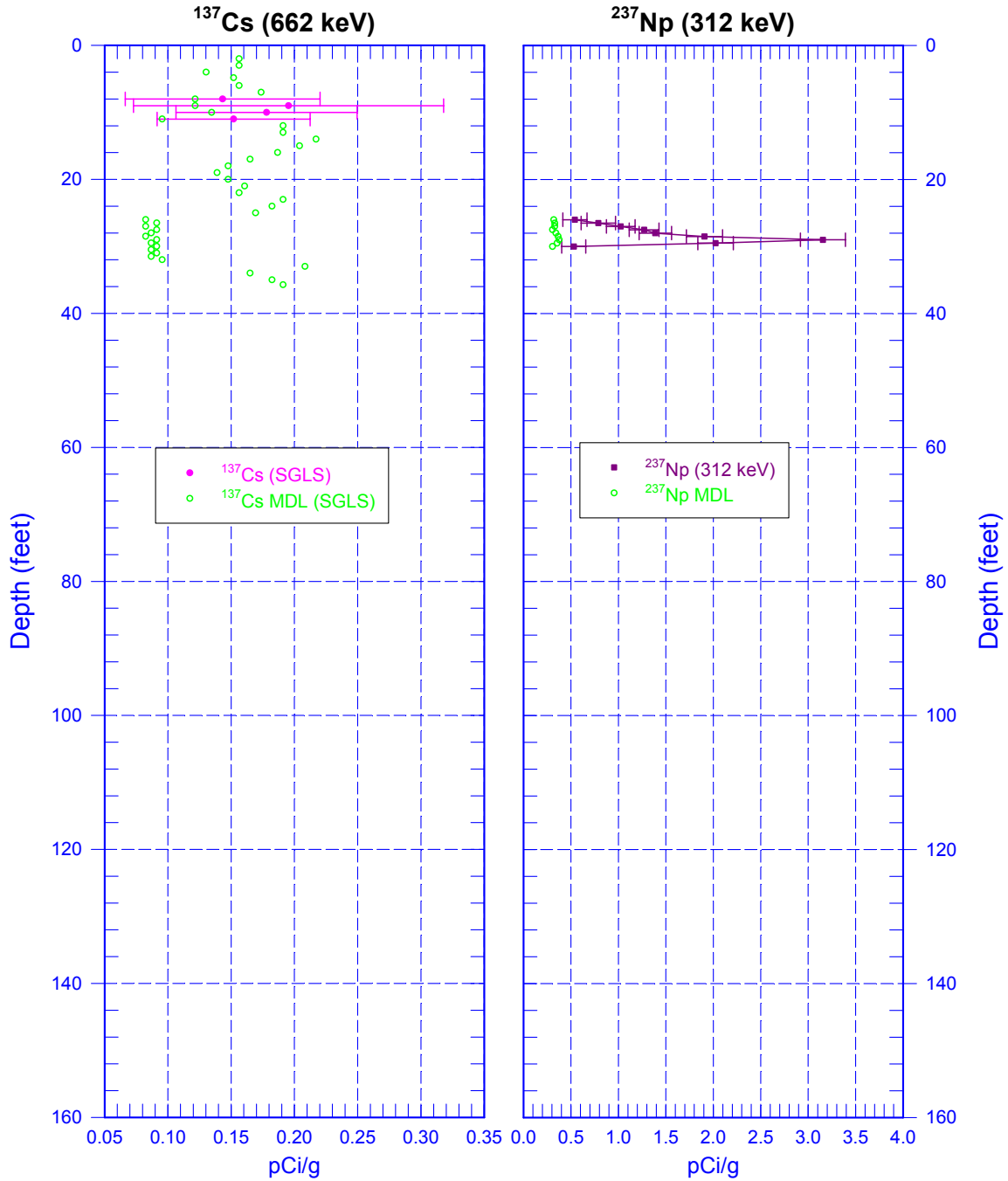
¹ GWL – groundwater level

² N/A – not applicable

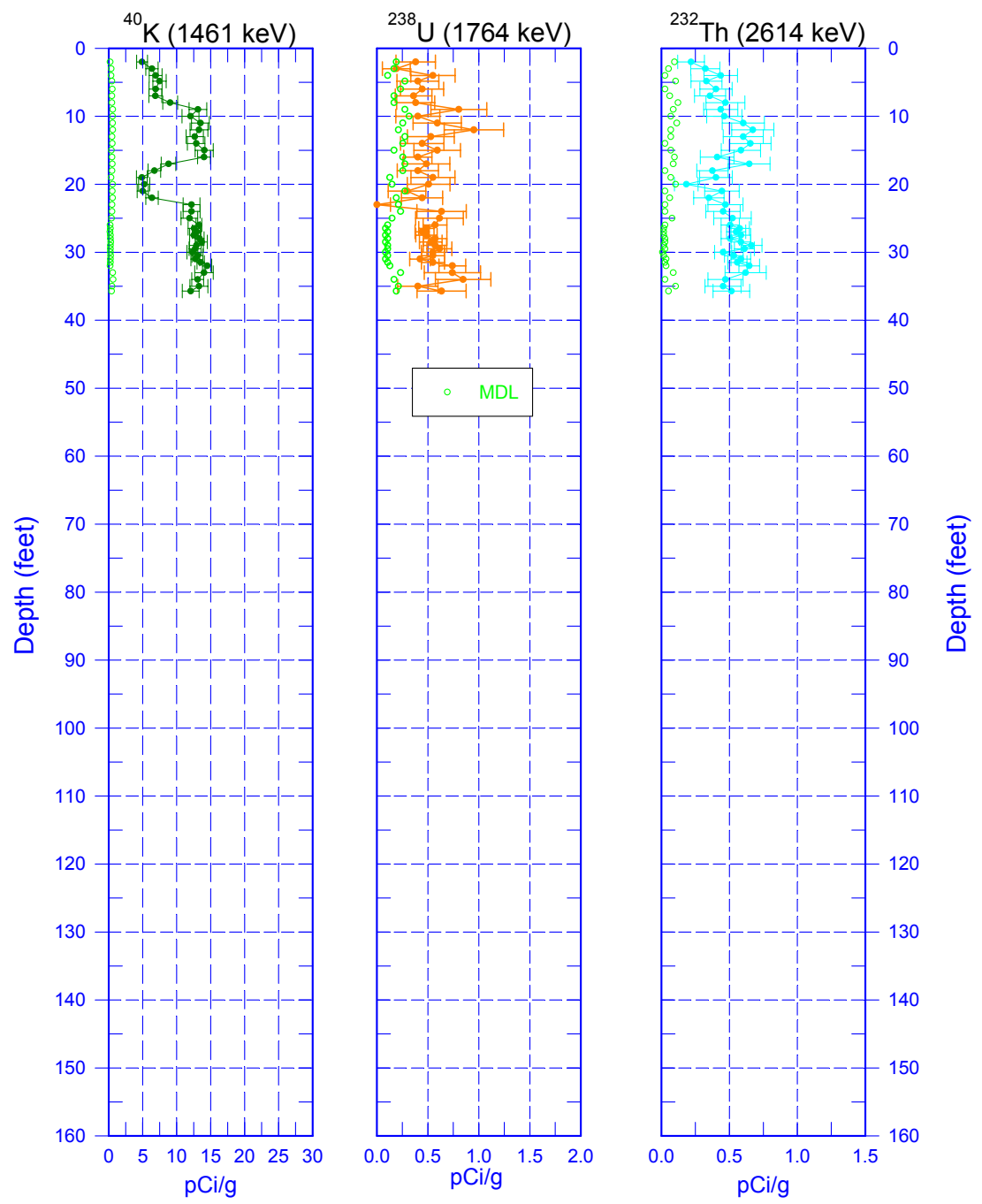
³ MDL – minimum detectable level

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Manmade Radionuclides

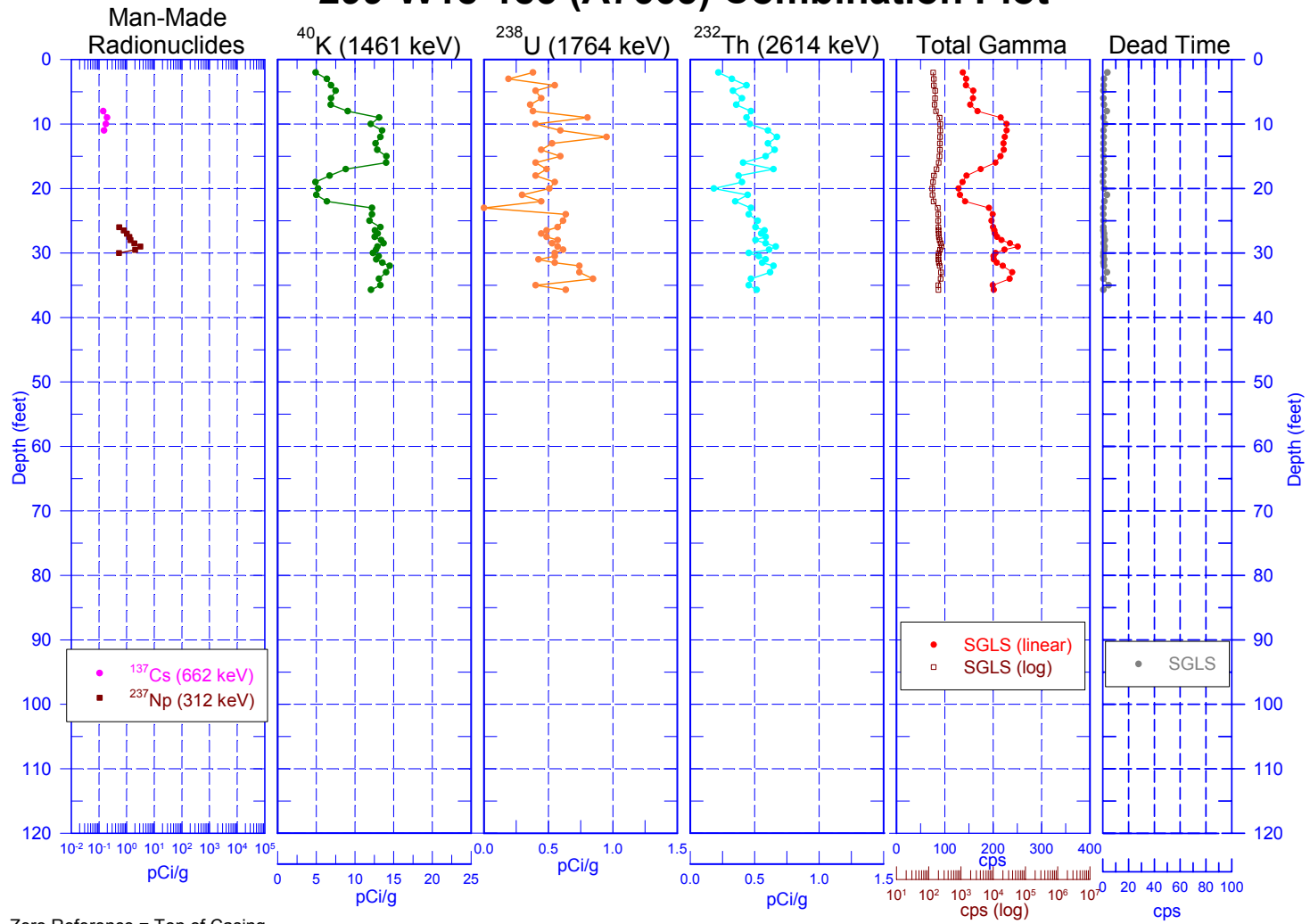


299-W18-183 (A7665)
Natural Gamma Logs

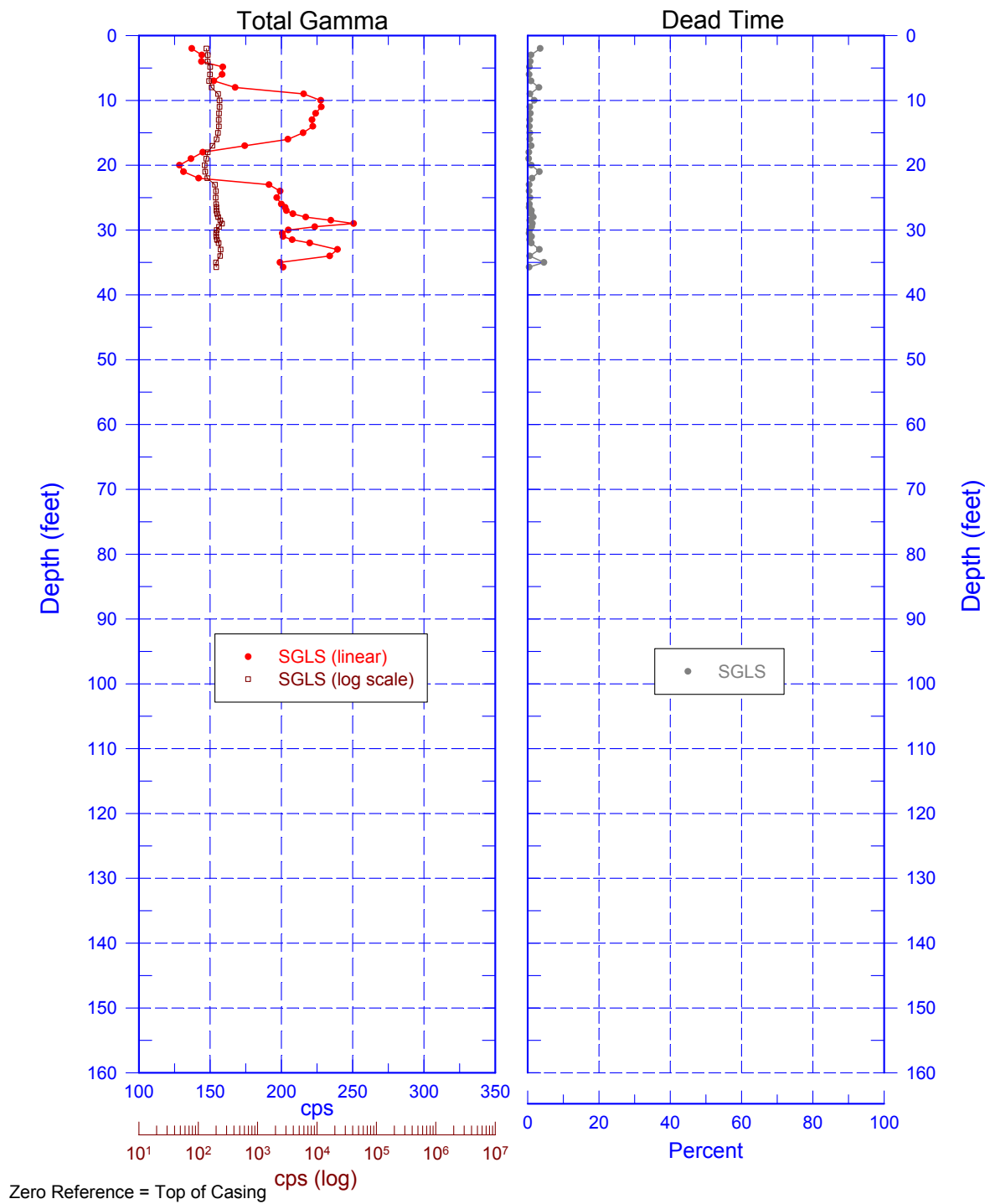


Zero Reference = Top of Casing

299-W18-183 (A7665) Combination Plot

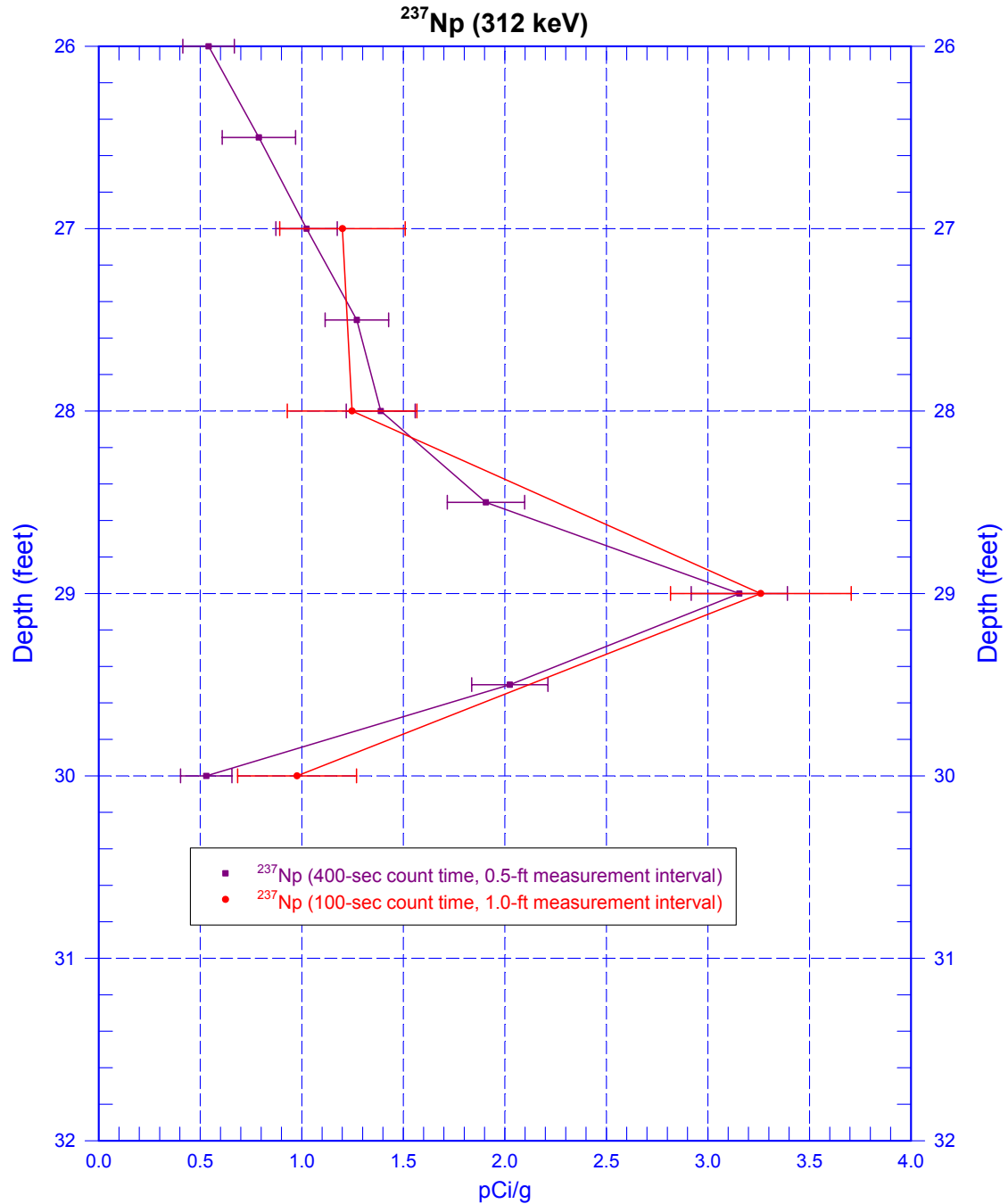


299-W18-183 (A7665) Total Gamma & Dead Time



299-W18-183 (A7665)

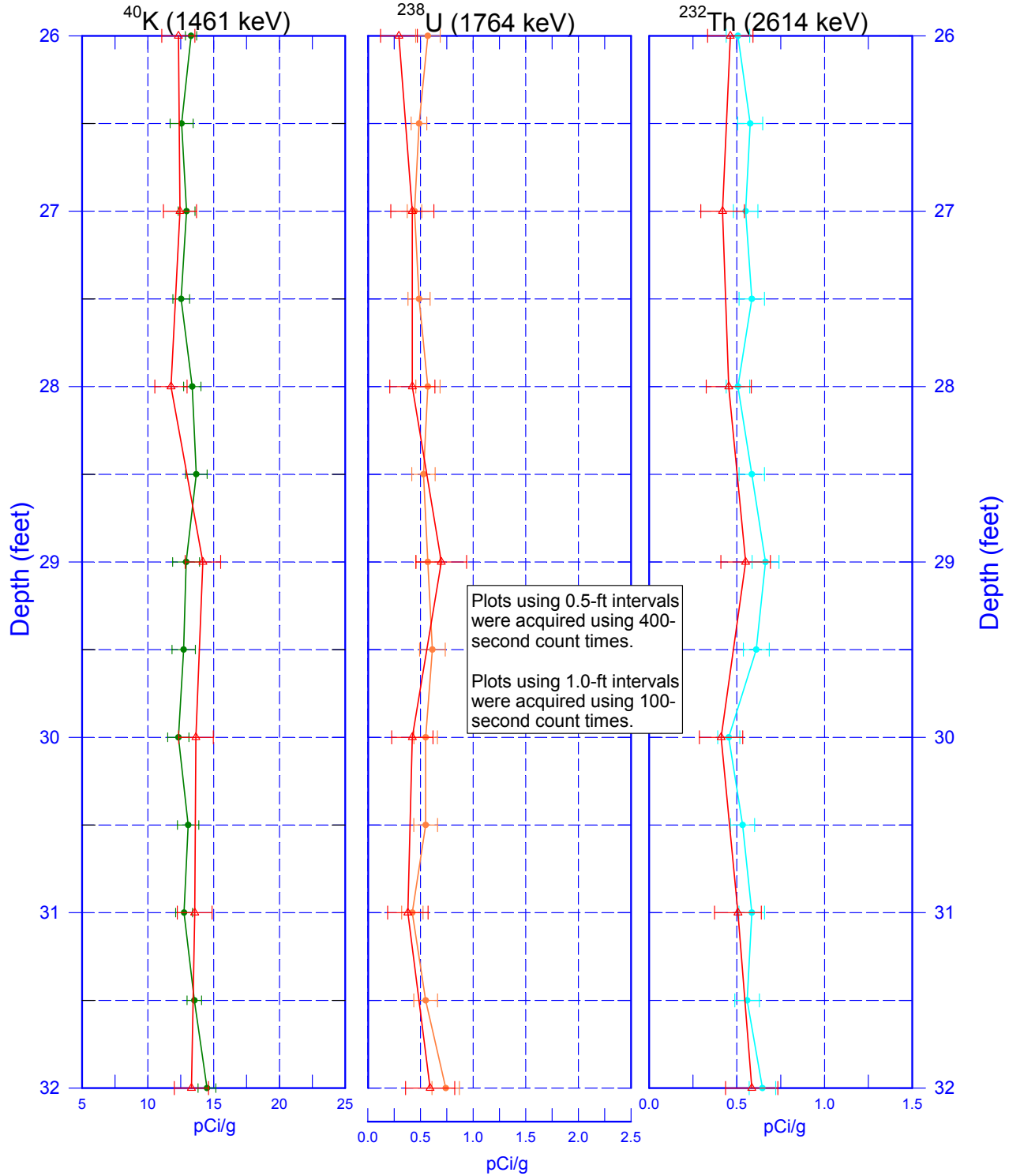
Manmade Radionuclides (100- vs. 400-second counts)



Zero Reference = Top of Casing

299-W18-183 (A7665)

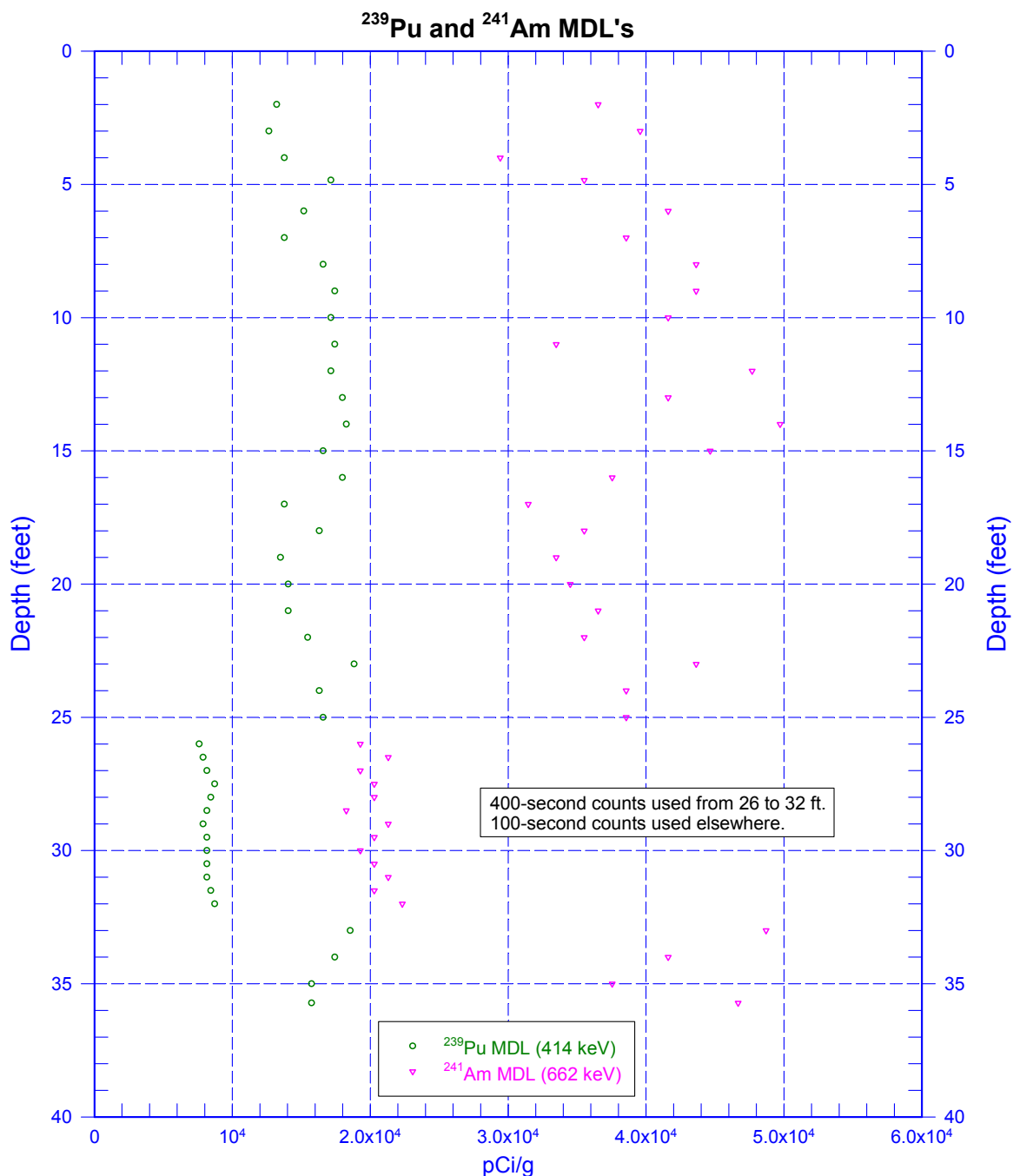
Repeat Section of Natural Gamma Logs



Zero Reference = Top of Casing

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MDL's for Selected Transuranic Radionuclides



Zero Reference = Top of Casing

299-W18-183 (A7665) Manmade Comparison

